

DUPLICATE

Rec'd PCT/PIU 09 MAR 2005

10/27243

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
18 March 2004 (18.03.2004)

PCT

(10) International Publication Number
WO 2004/022176 A1

(51) International Patent Classification⁷: A63B 71/12

(21) International Application Number:
PCT/NL2003/000626

(22) International Filing Date:
9 September 2003 (09.09.2003)

(25) Filing Language: Dutch

(26) Publication Language: English

(30) Priority Data:
1021419 9 September 2002 (09.09.2002) NL

(71) Applicant (for all designated States except US): DUTCH
THINKING MANAGEMENT B.V. [NL/NL]; Roo-
brughof 32, NL-3011 MJ Rotterdam (NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): VRIJBURG, Sjoerd,
Gerard [NL/NL]; Roobrughof 32, NL-3011 MJ Rotterdam
(NL).

(74) Agents: LAND, Addick, Adrianus, Gosling et al.;
Arnold & Siedsma, Sweelinckplein 1, NL-2517 GK The
Hague (NL).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE,
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,
KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT,
RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

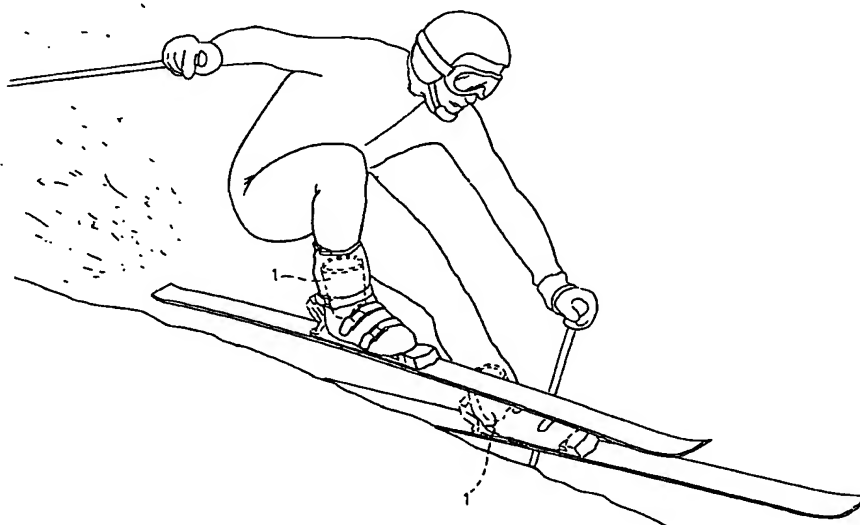
(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: DEVICE FOR PROTECTING A LEG



(57) Abstract: The present invention relates to a device (1) for protecting a leg (2), comprising: a body (3) with an underside and an upper side for placing round at least a part of a leg (2) above the foot as seen in vertical direction; wherein the body (3) comprises material with elastic properties, and wherein said body (3) at least partially encloses the leg as seen in horizontal direction.

WO 2004/022176 A1

DEVICE FOR PROTECTING A LEG

When relatively sturdy body-protecting or body-covering clothing or footwear are used, there relatively often occurs irritation of bodily tissues such as the skin, or deeper lying bodily tissues such as muscular tissues, or other organs of the human body. Such irritation can for instance occur when hard-shell footwear is used, such as is applied relatively often in the fields of ski or skate shoes and the like. Such types of footwear are therefore usually provided with a relatively soft inner lining.

Such an inner lining is usually unsatisfactory however. During skiing for instance, if the skier holds his lower leg in a forward inclining position, the front side of the leg is loaded heavily, whereby the above stated irritations can occur.

In order to obviate this drawback the present invention provides a device for protecting a leg, comprising:

- a body with an underside and an upper side for placing round at least a part of a leg above the foot as seen in vertical direction,
- wherein the body comprises material with elastic properties, and
- wherein the body at least partially encloses the leg as seen in horizontal direction.

The use of such a device provides an additional protection for the leg. Through the use of such an embodiment the leg is very well protected against irritation resulting from contact between for instance a ski-shoe and the skin. Types of irritation which can for instance be prevented hereby are skin irritations such as grazing or abrasion injuries or

irritations of underlying tissue, such as for instance bruising or contusions.

In a preferred embodiment a substantial part of the body, after being placed round a leg, wholly
5 encloses the leg in horizontal direction. In this embodiment the body extends wholly around the leg. This has the advantage for instance that the body is firmly attached after placing round the leg. A further
10 advantage is that the protection of the leg is present on all sides. A good distribution of pressure load coming from outside is hereby possible.

In a further embodiment the underside of the body is provided with a recess for placing on the front side of a leg. If the device is placed round the bottom
15 part of a leg, it is advantageous if the upper part of the foot is kept free of load by the body. This objective is achieved by the recess of the present embodiment. A further advantage hereof is that, if the leg moves forward relative to a horizontal foot,
20 material of the body is not caught between the decreasing space between the foot and the leg moving toward it.

The device preferably further comprises at least one support member for supporting a part of the
25 leg adjacent to the member after placing round a leg. An advantage hereof is that particular parts of a leg can be better supported. This is for instance important since a leg does not have a uniform shape and/or structure. At the front a part of the shinbone can
30 protrude relative to tissue located round the bone, particularly in the case of load. The skin at the position of the bone can hereby be excessively pinched under load. One or more support members can help prevent such a load.

In a further embodiment two support members on the inner side of the body, which are arranged substantially on either side of the front sides of the body, are useful in preventing the irritation caused by the bone in combination with the hard shell of footwear. Other support members for preventing other irritations can however also be envisaged. It is likewise possible to prevent irritations by cutting out parts of the body, whereby the body exerts no pressure at determined positions. However, the body will then exert pressure at locations round the recess.

The thickness of the body or the support members is preferably variable. A variable thickness of the material of the body has the advantageous effect that the support or pressure on the leg varies with the thickness. Thicker parts of the body provide a greater pressure than thinner parts.

The dimensioning of the body is preferably such that the device fits closely around a leg. It is possible here to envisage a narrower lower part than upper part, since a leg is usually narrower in the ankle region than in the calf region.

The body and/or the support members preferably comprise a plastic. It is possible here to envisage for instance neoprene. This material has very good elastic properties and a very low water-absorbing capacity, whereby little water for instance is absorbed and also that little dirt will be drawn into the material with the water.

A device according to the invention preferably further comprises fastening means for fastening the body round a leg. Certainly if the body does not wholly enclose the leg in horizontal direction, it is advantageous to provide the body with fastening means. Such fastening means enable a good fixation at the

correct position relative to the leg. A specific suitable embodiment of the fastening means is a hook and loop fastening such as velcro tape.

5 In a further embodiment the body is fastened in substantially cylindrical or conical form along a substantially vertical seam. By choosing a correct form and diameter a device is hereby realized with a body which is arranged over the whole surface with a roughly equal degree of tightness.

10 In a further embodiment the body comprises markings for removing a part of the body therealong. As already discussed in the foregoing, it may be advantageous to arrange specific recesses in the body in order to reduce the pressure on the leg at the position
15 of the recess. Since different users can have different wishes, it is advantageous if the recesses can be arranged as desired by the user. Markings with indications of their function can advantageously assist in creating suitable and/or desired recesses.

20 Further advantages, features and details of the present invention will be described with reference to the annexed figures, in which:

- Figure 1 shows a partly cut-away view of a first embodiment in a first use;
- 25 - Figure 2 is a partly cut-away view of a detail of Figure 1;
- Figure 3 is a perspective view of an embodiment according to the present invention;
- Figure 4 is a partly cut-away view in
30 perspective of a further embodiment according to the present invention;
- Figure 5 is a view in perspective of a further embodiment according to the present invention;
- Figure 6 is a view in perspective of a
35 further embodiment according to the present invention;

- Figure 7 is a view in perspective of a further embodiment according to the present invention.

An application of an embodiment according to the present invention (Figure 1) is the placing of a support body round the shinbones of the shown skier. A detail hereof (Figure 2) shows support body 1 that is placed round a leg L. As shown, the form of the support body is chosen such that the diameter at the top is greater than at the bottom so as to thereby follow the contours of the leg.

A further preferred embodiment (Figure 3) is shown in schematic style. In this view the body 3 is shown with a tapering shape. It can however be less conical with a different cutting. The material of this embodiment is preferably neoprene, since this has very useful material properties, such as being very elastic, moisture-proof, soft and yielding. The front side of this embodiment is in the direction of the arrow F. In this embodiment the front side is provided at the bottom with a recess which is bounded by cut surface 5. On the rear side of the device the outer sides of body 3 are attached to each other by means of stitched seam 6. This can optionally be reinforced by means of a glue connection. A glue connection alone can optionally also suffice. Because this embodiment is closed on the rear side, it can be placed in very simple manner round the leg by pulling body 3 over the foot until it is situated round the bottom part of the leg at the correct or desired position.

The thickness of the plastic or neoprene material lies in the range of several millimetres to several centimetres. Such thicknesses can be chosen subject to the load environment in which it will be used. The exact composition of the plastic or neoprene can likewise be chosen subject to the precise

application, so that the most suitable material properties are available.

Figure 4 shows a further embodiment. This comprises a body 7 which is connected at the rear by means of a seam 8 in similar manner to the embodiment in Figure 3. This embodiment is further provided with support means 9, 10 arranged on the inner sides at the front of the body. The positioning is herein such that if the body is situated round a lower leg, the shinbone is located substantially between the support cushions 9, 10. Extra pressure is hereby exerted on the parts adjacent to the shinbone, thereby relieving the pressure on the skin on the shinbone.

In a further embodiment (Figure 5) areas with velcro tape 13 are situated on the inner side of body 12. Extra support cushions 14, 15 are further present which are likewise provided with velcro tape 16. By applying this velcro tape this embodiment can be used both with and without the extra support cushions 14, 15. The support cushions can further be positioned as desired on the inside of body 12, whereby a user of the device can determine for him/herself exactly where they are positioned.

In a further embodiment (Figure 6) the body 17 is not connected fixedly at the rear. In this embodiment velcro tape 18, 19 is provided for fastening the body. It is possible here to place the body more tightly or less tightly round the leg. It is of course possible to leave some space between the left and right-hand sides at the rear of the device.

In a further preferred embodiment the body 21 extends over a part of the periphery of a leg. The body is here provided with fastening means in the form of for instance velcro tape 22 for fastening the body round a leg. It is likewise possible to embody such an

embodiment without fastening means 22, wherein the body 21 is clamped against a leg by means of for instance a stocking or hard-shell footwear inside which the body is applied.

5 Further advantages of the above described embodiments are that, for instance in the application in a ski-shoe, the leg can be placed firmly in the leg part of the ski-shoe during skiing, thereby enabling better steering of the ski during use. If the underside of the
10 leg part is placed just above the ankle, the presence here of the resilient elastic material relieves the pressure on the protruding ankles. An additional protection for the leg by means of a device according to the present invention is becoming increasingly more
15 important because higher speeds are becoming possible through developments relating to skis. The skier is hereby loaded more at the position of the lower leg, whereby extra support becomes more important.

It is further possible to adapt the design of
20 the bodies specifically to a left leg and a right leg, whereby account can be taken of specific differences in the shape of a left leg and a right leg.

Because the material can stretch, practically all leg sizes can be provided with a suitable leg part
25 using a limited number of sizes. A further advantage of the material choice is that it has a particularly low specific weight, thereby simplifying transport of the leg parts. When designing the support bodies it is further possible to take into account the differences
30 between the legs of women and men. Aspects of design and dimensioning are both important here.

Further types of material which can be applied in the above described embodiments are diverse types of rubber or latex, such as medicinal rubber, orthopaedic
35 rubber. Foam types such as memory foam, such as Tempur,

can also be very readily applied. Embodiments comprising closed cell foam are also very practical.

The rights are not limited by the above described embodiments. The rights sought are defined by
5 the following claims.

CLAIMS

1. Device for protecting a leg, comprising:
 - a body with an underside and an upper side for placing round at least a part of a leg above the foot as seen in vertical direction,
 - 5 - wherein the body comprises material with elastic properties, and
 - wherein the body at least partially encloses the leg as seen in horizontal direction.
2. Device as claimed in claim 1, wherein a
- 10 substantial part of the body, after being placed round a leg, wholly encloses the leg in horizontal direction.
3. Device as claimed in claim 1 or 2, wherein the underside of the body is provided with a recess for placing on the front side of a leg.
- 15 4. Device as claimed in one or more of the foregoing claims, comprising at least one support member for supporting a part of the leg adjacent to the member after placing round a leg.
5. Device as claimed in claim 4, comprising
- 20 two support members on the inner side of the body, which are arranged substantially on either side of the front side of the body.
6. Device as claimed in claim 4 or 5, wherein the support members comprise the same materials as the
- 25 body.
7. Device as claimed in one or more of the foregoing claims, wherein the thickness of the body or the support members is variable.
8. Device as claimed in one or more of the
- 30 foregoing claims, wherein the dimensioning is chosen such that the device fits closely around a leg.

9. Device as claimed in one or more of the foregoing claims, wherein the body and/or the support members comprise a plastic.

10. Device as claimed in one or more of the foregoing claims, wherein the body and/or the support members comprise neoprene.

11. Device as claimed in one or more of the claims 1-9, wherein the body and/or the support members comprise foam or memory foam.

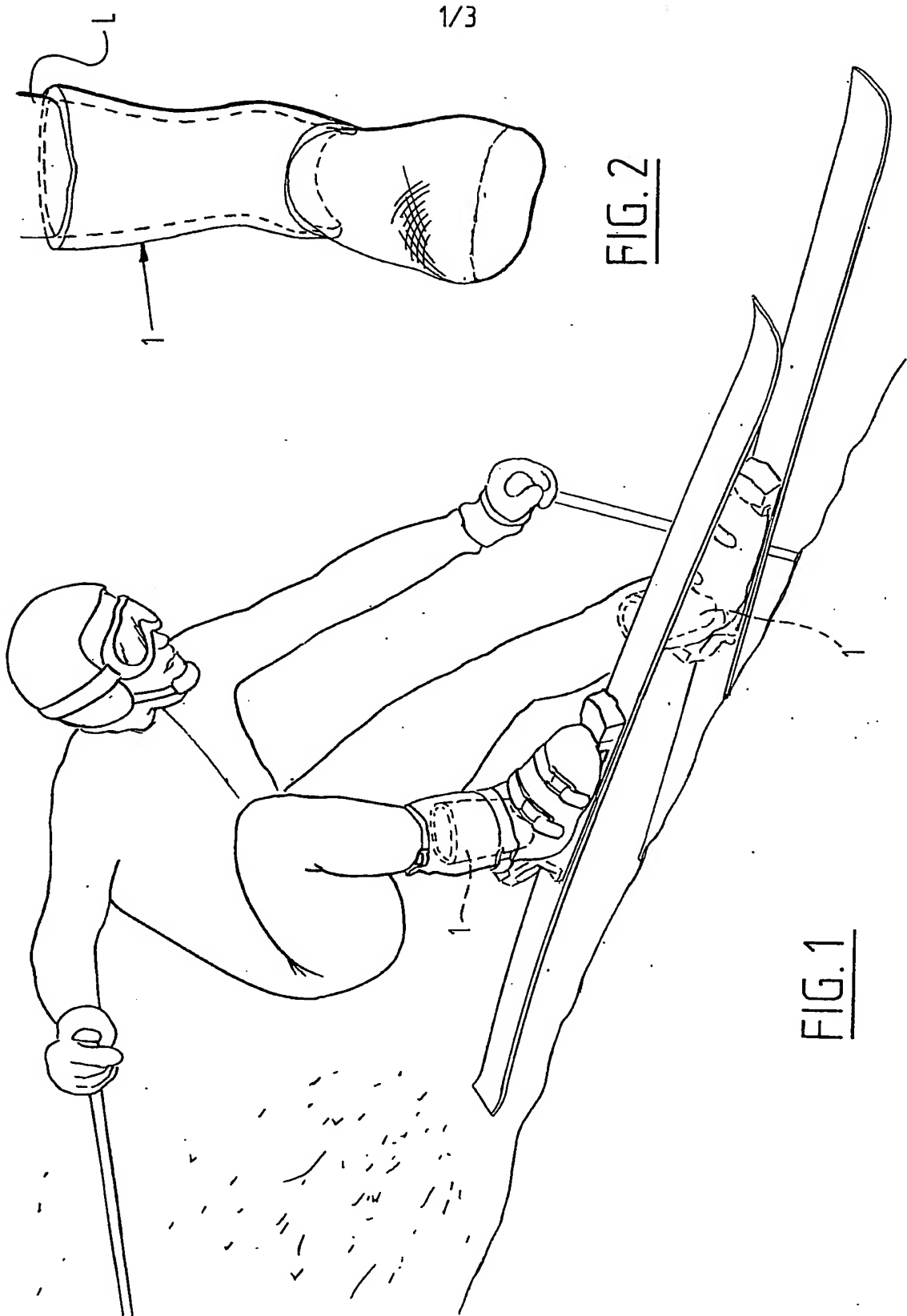
12. Device as claimed in one or more of the claims 1-8, wherein the body and/or the support members comprise rubber or latex.

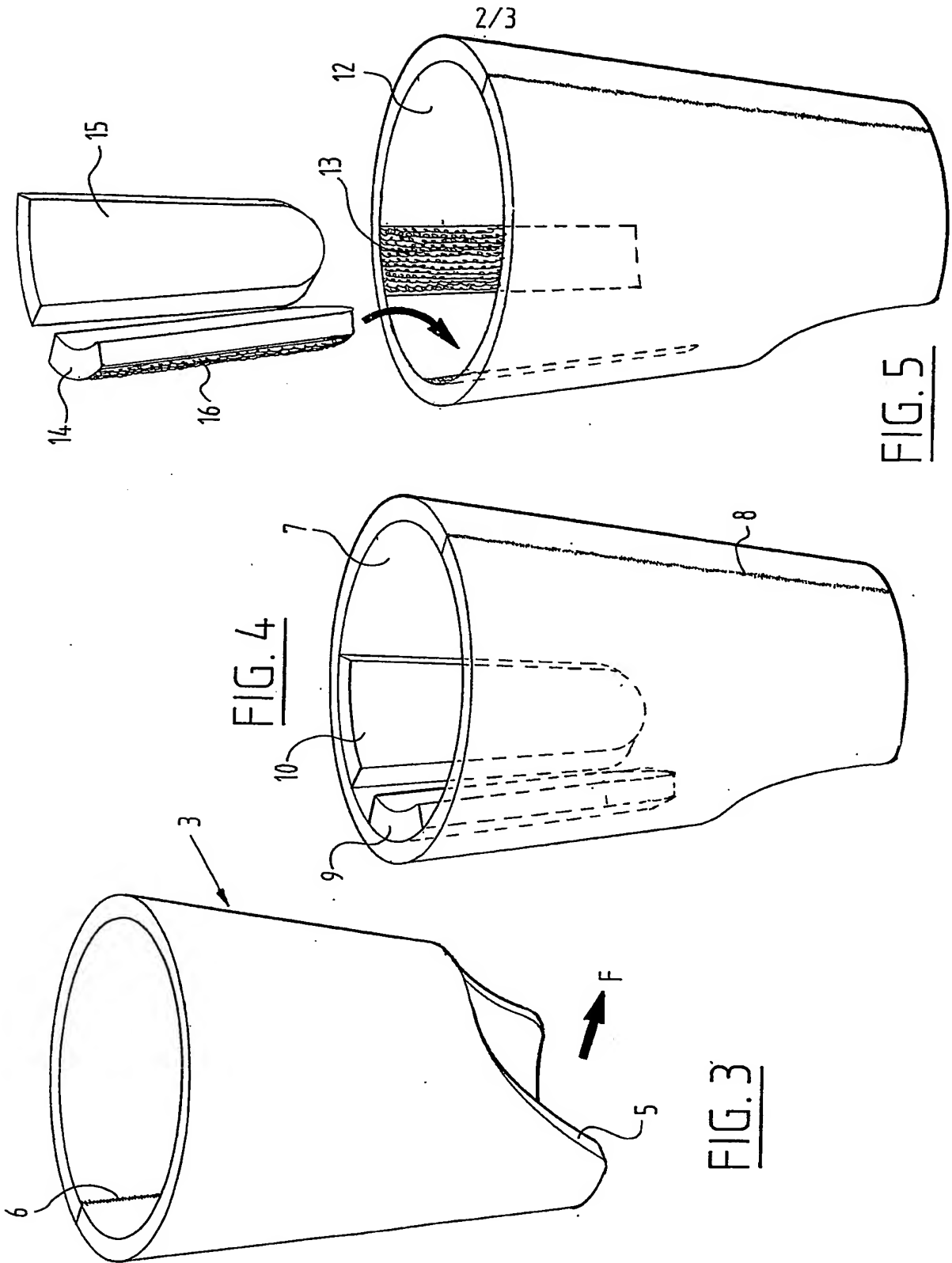
13. Device as claimed in one or more of the foregoing claims, further comprising fastening means for fastening the body round a leg.

14. Device as claimed in claim 13, wherein the fastening means comprises a hook and loop fastening such as velcro tape.

15. Device as claimed in one or more of the claims 1-12, wherein the body is fastened in substantially cylindrical or conical form along a substantially vertical seam.

16. Device as claimed in one or more of the foregoing claims, comprising markings for removing at least a part of the body therealong.





3/3

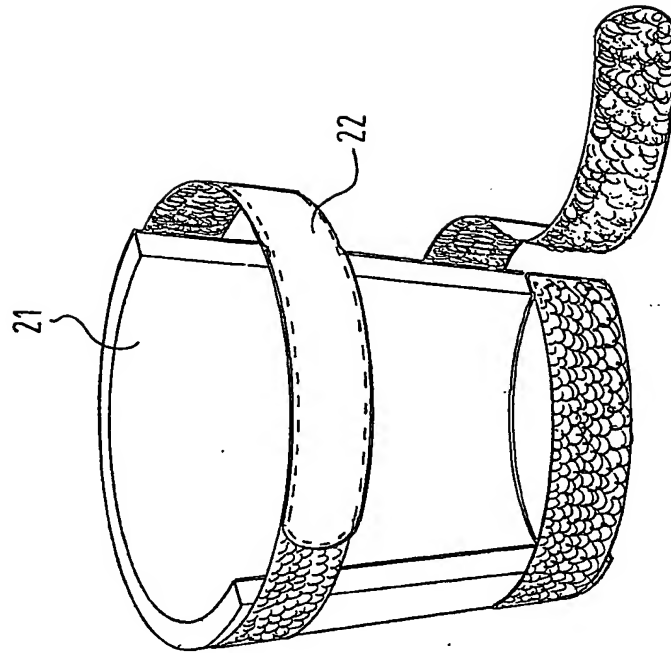


FIG. 7

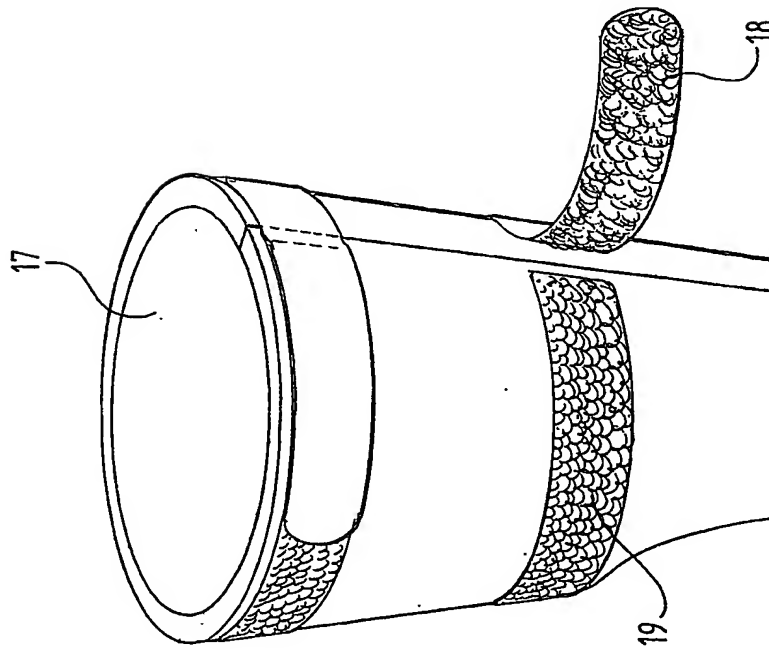


FIG. 6

INTERNATIONAL SEARCH REPORT

International Application No

i NL 03/00626

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A63B71/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 199 51 990 C (ALFIERI ANTONIO) 25 January 2001 (2001-01-25) column 2, line 32 -column 3, line 62; figures 2A,5	1-15
X	DE 26 07 628 A (DASSLER ADOLF) 1 September 1977 (1977-09-01) page 8, line 7 -page 10, line 29; figure 1	1-5, 7-15
X	EP 0 682 960 A (DIADORA SPA) 22 November 1995 (1995-11-22) column 2, line 42 -column 3, line 54; figures 3,7 --- -/--	1-5, 8-11, 13-15

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the International filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the International filing date but later than the priority date claimed

- *T* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the International search

20 January 2004

Date of mailing of the International search report

29/01/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Kroeders, M

INTERNATIONAL SEARCH REPORT

Inventor's Name: NL 03/00626

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 94 07 629 U (FINSTERSEIFER AXEL) 14 July 1994 (1994-07-14) page 4, line 1 - line 23; figure 1 ---	1-5, 8-10, 12-15
X A	US 4 344 189 A (FUTERE ALBERT L ET AL) 17 August 1982 (1982-08-17) column 4, line 18 -column 5, line 58; figures 1,3 ---	1-4,8,9, 13,15 16
X	US 5 842 475 A (VAUGHTER ERIC D ET AL) 1 December 1998 (1998-12-01) column 4, line 15 -column 7, line 58; figures 12,14,17 ---	1,3-5, 7-9,11, 13,14
X	DE 23 10 149 A (AURACHER WALTER) 5 September 1974 (1974-09-05) page 3, line 15 -page 4, line 22; figures 3,4 -----	1,3-5, 7-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inventor's International Application No
NL 03/00626

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 19951990	C	25-01-2001	DE 19951990 C1 AT 245462 T DE 50003033 D1 DK 1225960 T3 WO 0132273 A1 EP 1225960 A1 JP 2003512906 T	25-01-2001 15-08-2003 28-08-2003 17-11-2003 10-05-2001 31-07-2002 08-04-2003
DE 2607628	A	01-09-1977	DE 2607628 A1	01-09-1977
EP 0682960	A	22-11-1995	IT PD940093 A1 EP 0682960 A1	20-11-1995 22-11-1995
DE 9407629	U	14-07-1994	DE 9307949 U1 DE 9407629 U1	16-09-1993 14-07-1994
US 4344189	A	17-08-1982	US 4001953 A CA 1056104 A1 DE 2516388 A1 FR 2267060 A1 GB 1494698 A JP 1169295 C JP 50146439 A JP 57061433 B US 4035860 A	11-01-1977 12-06-1979 23-10-1975 07-11-1975 14-12-1977 30-09-1983 25-11-1975 24-12-1982 19-07-1977
US 5842475	A	01-12-1998	US 5732713 A US 5544663 A	31-03-1998 13-08-1996
DE 2310149	A	05-09-1974	DE 2310149 A1	05-09-1974